



## Human body exergy consumption and thermal comfort of an office worker in typical and extreme weather conditions in Finland

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**Author(s):** Ala-Juusela M, Shukuya M  
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### Abstract:

Finding the way to predict optimal thermal conditions for an office worker would contribute to sustainable building design: the environmental effects would be reduced, the economics of the organization and whole society would improve and there would be indisputable social benefits for the individual and the global community. These benefits stem from the improved productivity of the office worker in most favorable thermal environment and the possibilities to achieve this with lower energy demand. This study uses a new approach, exergy analysis, to recognise the optimal conditions by looking for the combination of mean radiant temperature and room air temperature giving the lowest human body exergy consumption rate. All of the commonly used thermal comfort prediction methods use energy analysis, and it seems that exergy analysis could give more accurate prediction of the conditions giving optimal thermal comfort. The new method is applied to the case of office worker in typical and extreme weather conditions in Finland. The results agree well with the previous analyses, and moreover, the points giving minimum human body exergy consumption rate coincide with the points usually regarded as most comfortable in summer conditions. According to recent studies, people are also most productive at these conditions.

**Source:** <http://dx.doi.org/10.1016/j.enbuild.2014.02.067>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Indoor Environment, Meteorological Factors, Temperature

**Temperature:** Extreme Cold, Extreme Heat, Fluctuations

#### Geographic Feature:

resource focuses on specific type of geography

Urban

#### Geographic Location:

resource focuses on specific location

Non-United States

# Climate Change and Human Health Literature Portal

**Non-United States:** Europe

**European Region/Country:** European Country

**Other European Country :** Finland

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

**Other Health Impact:** thermal comfort

**Population of Concern:** A focus of content

**Population of Concern:** ☒

populations at particular risk or vulnerability to climate change impacts

Workers

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Time Scale Unspecified